

بسم الله الرحمن الرحيم

A Course on

Energy Conservation

Building Automation System

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- 1- It controls energy-consuming equipment in a building.**
- 2- Also called a building management system (BMS).**
- 3- Includes: HVAC, electric diagnostics, fire alarm and fire fighting, safety functions, and security services.**

Communications
Voice/Video/Data

Video Surveillance

Camera
Site Recorders
NVRs

Lighting

Schedules
Occupancy Sentry
Tenant Metering

Alarm/Access Control

Badge Testers
IO Management
Intrusion Detection

Power

Distribution
Usage
Back-Up Generation

**Interactive
Communications
Systems**

PA Systems
Intercoms

HVAC

Performance Optimization
Boilers, Pumps, Fans
Energy Control
Air Quality

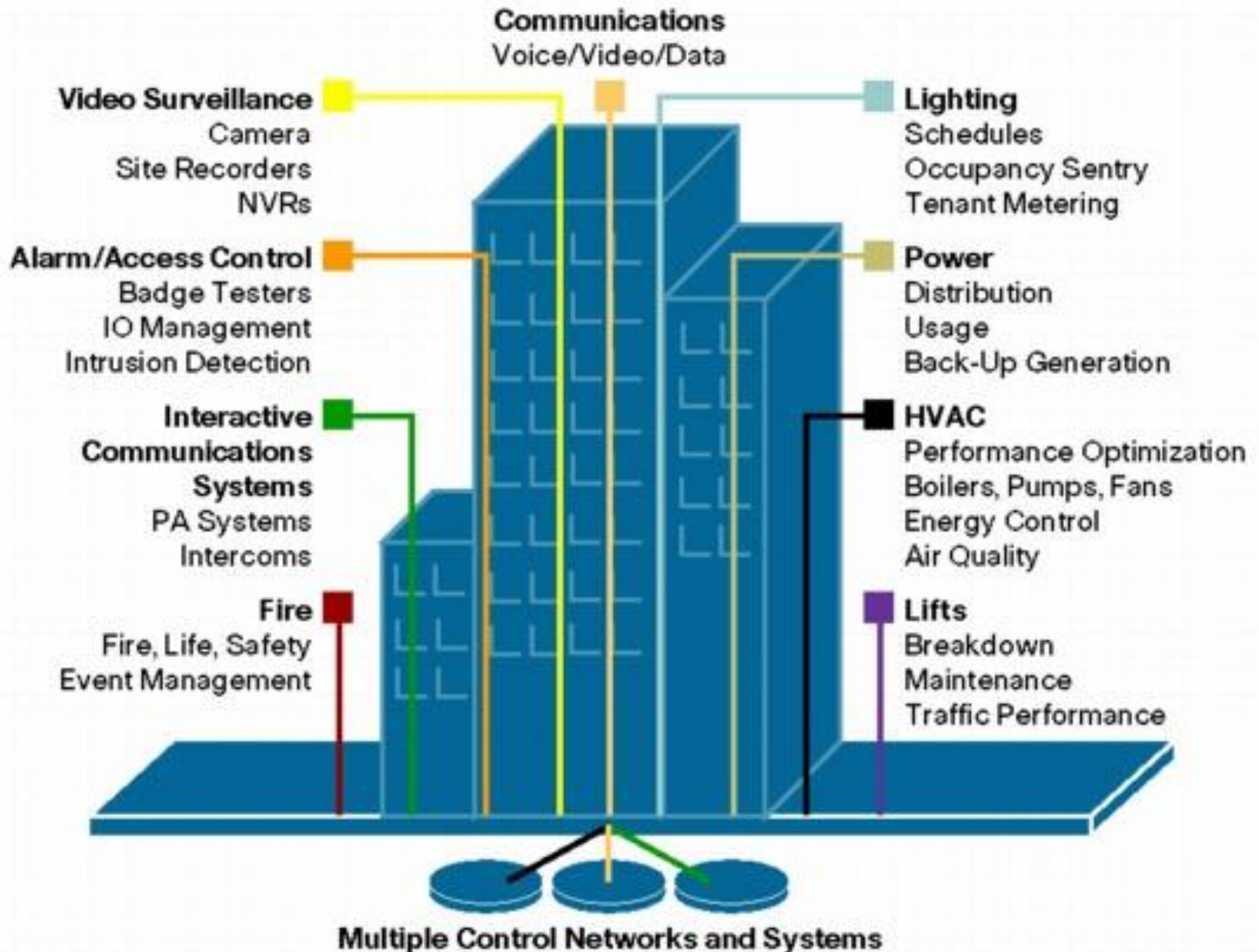
Fire

Fire, Life, Safety
Event Management

Lifts

Breakdown
Maintenance
Traffic Performance

Multiple Control Networks and Systems

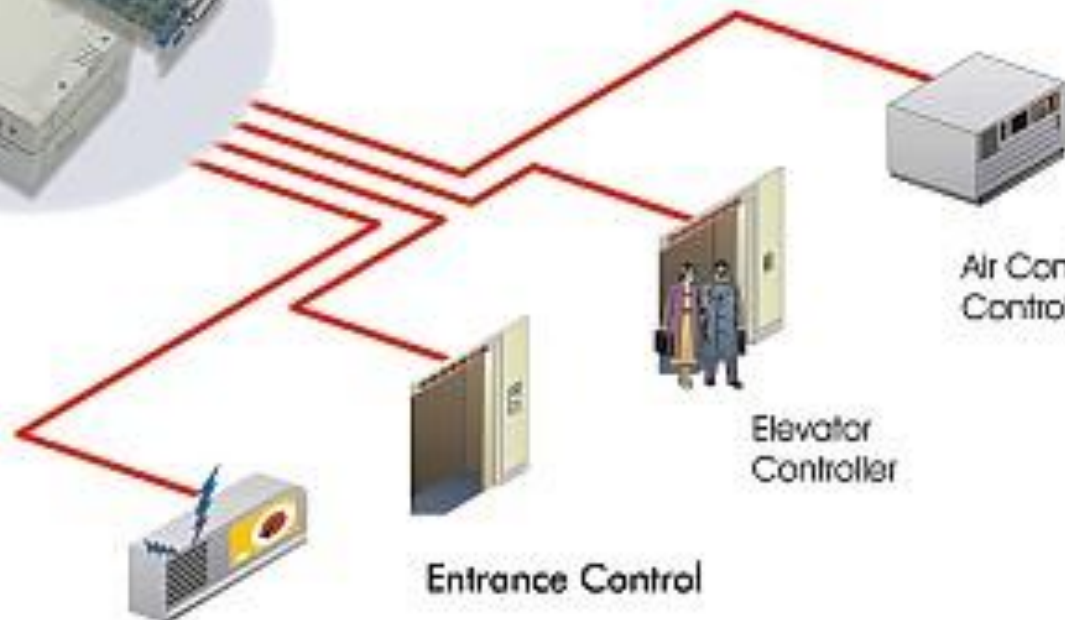


Ethernet

MOXA
Intellio C320



Windows NT
Server



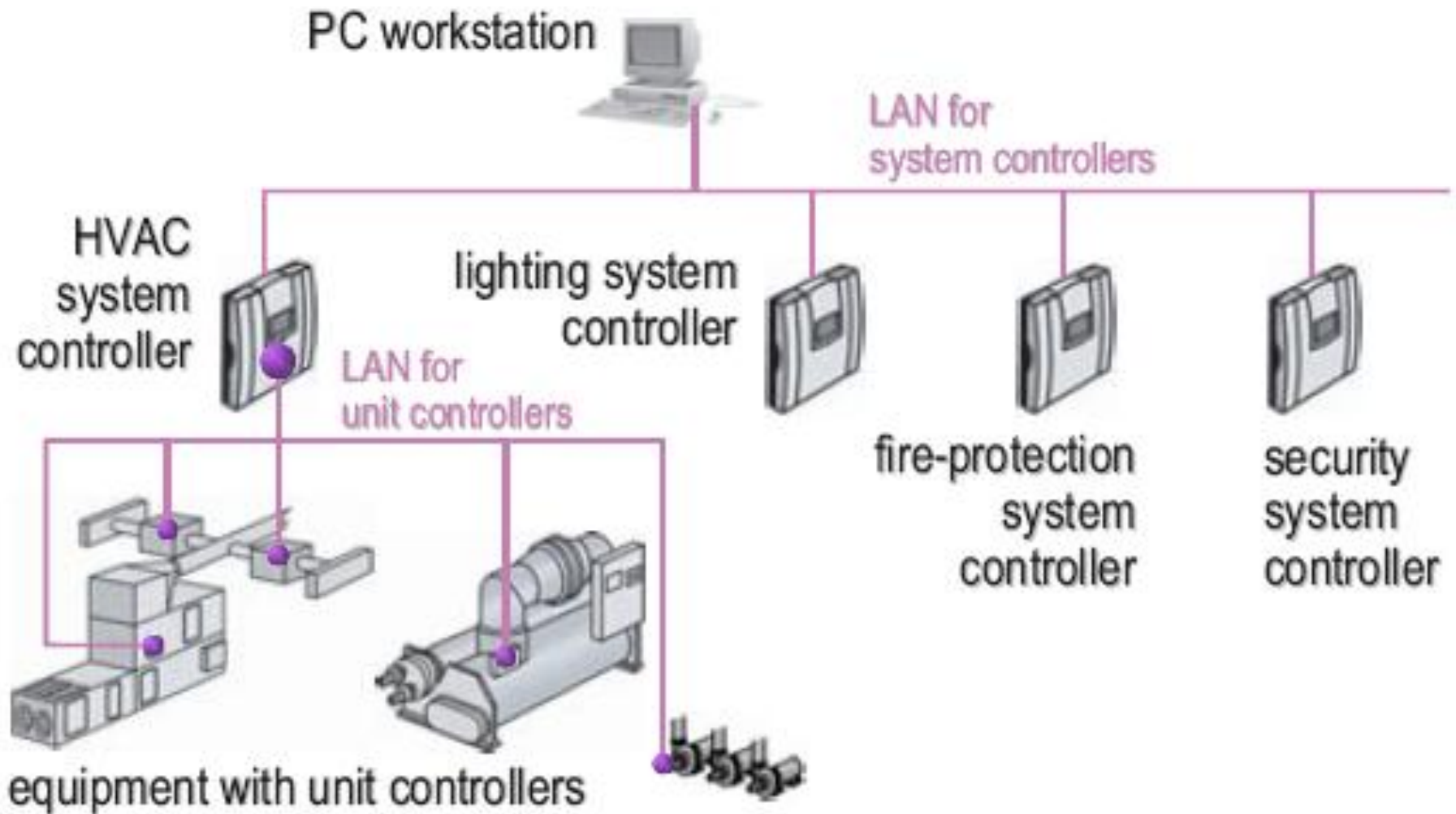
Fire Alarm System

Entrance Control

Elevator
Controller

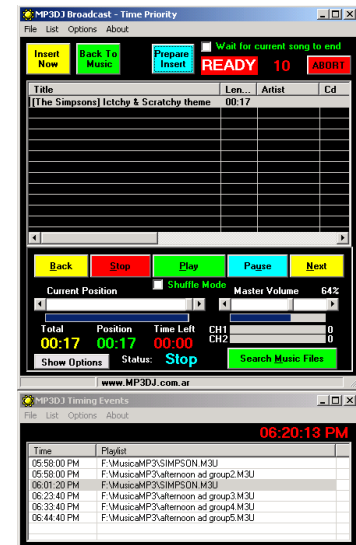
Air Conditioner
Controller

INTRODUCTION



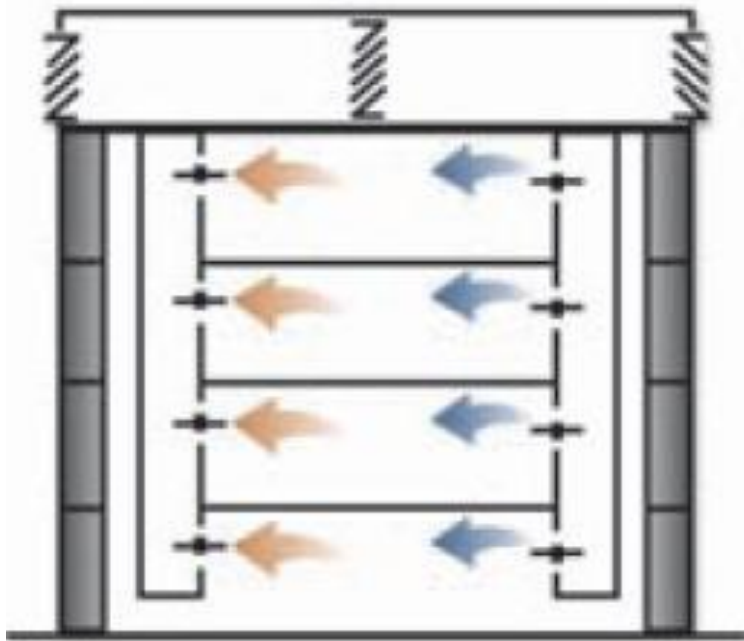
INTRODUCTION

A (BAS) mainly consists of sensors, controllers, actuators, and software.

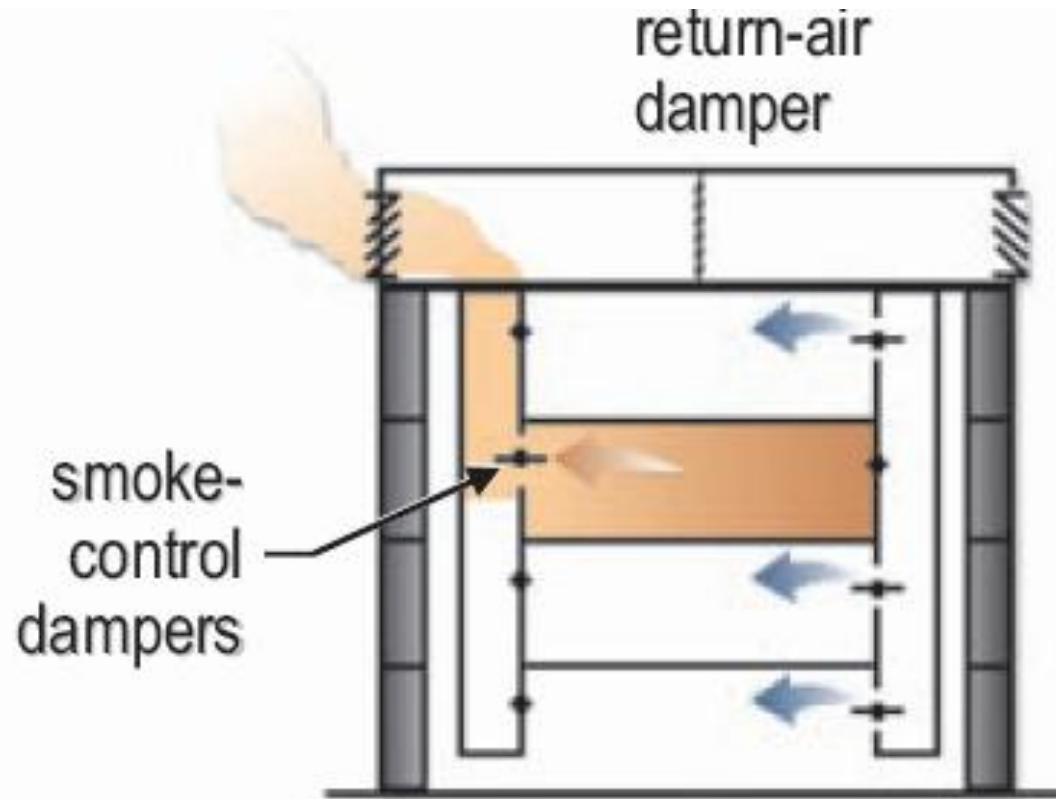


INTRODUCTION

Example



normal HVAC operation



smoke-control operation

INTRODUCTION

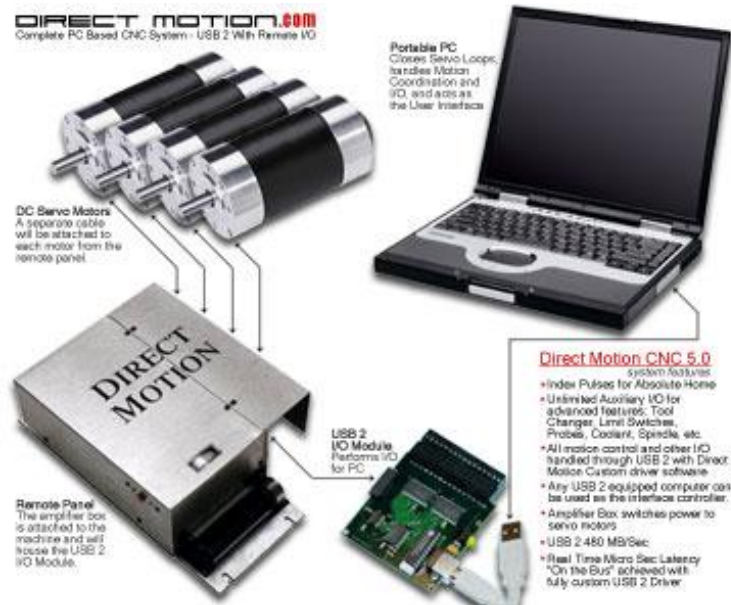
An operator interfaces with the system via a central workstation.



CONTROL SYSTEM TYPES

Direct Digital Controls (DDC)

Uses **electronic signals** via computer to process data for **direct system control**.

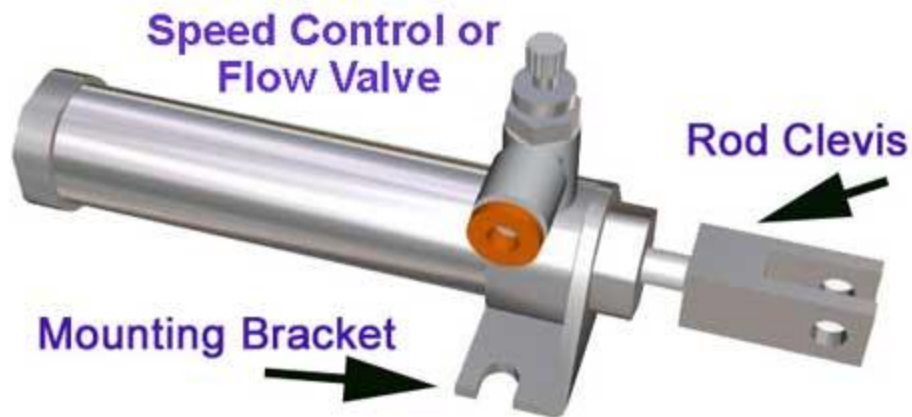


CONTROL SYSTEM TYPES

Direct Digital Controls (DDC)

Sometimes incorporate pneumatically powered actuators for **valves** and **dampers**.

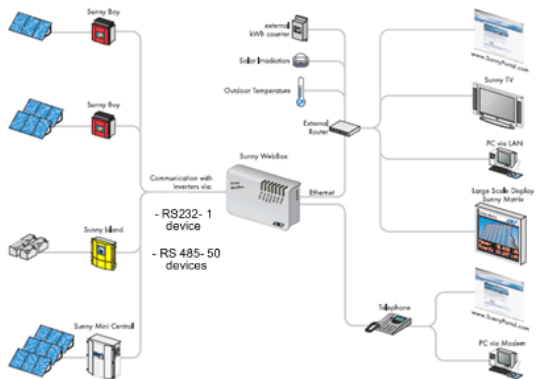
Pneumatic Cylinder



CONTROL SYSTEM TYPES

Stand-Alone Controls

Built into individual pieces of large equipment. Some of these are capable of implementing many of the control strategies. They can be "tied-in" to the BAS using a common communications protocol.

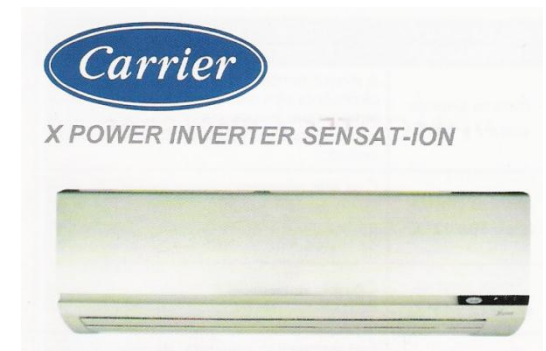


COMMUNICATIONS PROTOCOL

Proprietary Communications



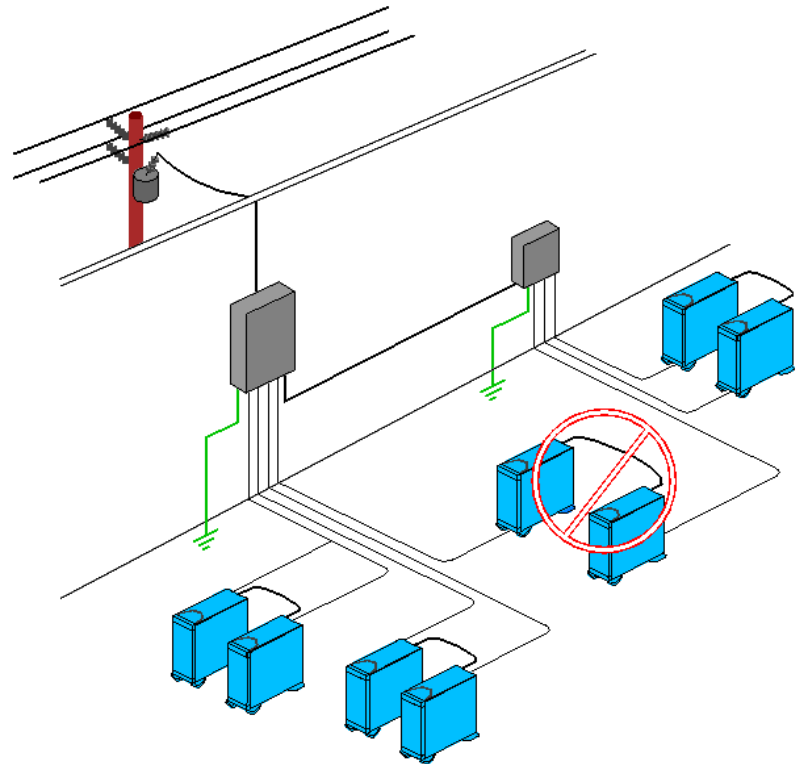
Same manufacturer



COMMUNICATIONS PROTOCOL

Proprietary Communications

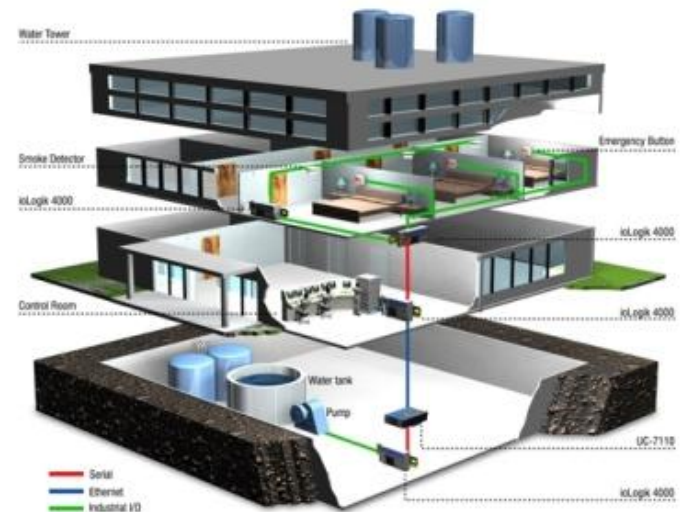
The user's options for expansion of the BAS are **limited**.



COMMUNICATIONS PROTOCOL

Open Communications

- Use **published protocols**, which are open to all manufacturers.
- There are **two major choices**.



COMMUNICATIONS PROTOCOL

Open Communications

ASHRAE

(the American Society of Heating,
Refrigerating, and Air-Conditioning Engineers).



COMMUNICATIONS PROTOCOL

Open Communications

Advantages of open communications protocol:

1- Ensure that equipment from **multiple** manufacturers will be able to interact.



2- Creates a **competitive bidding** environment for system additions and renovations, which helps to limit costs.

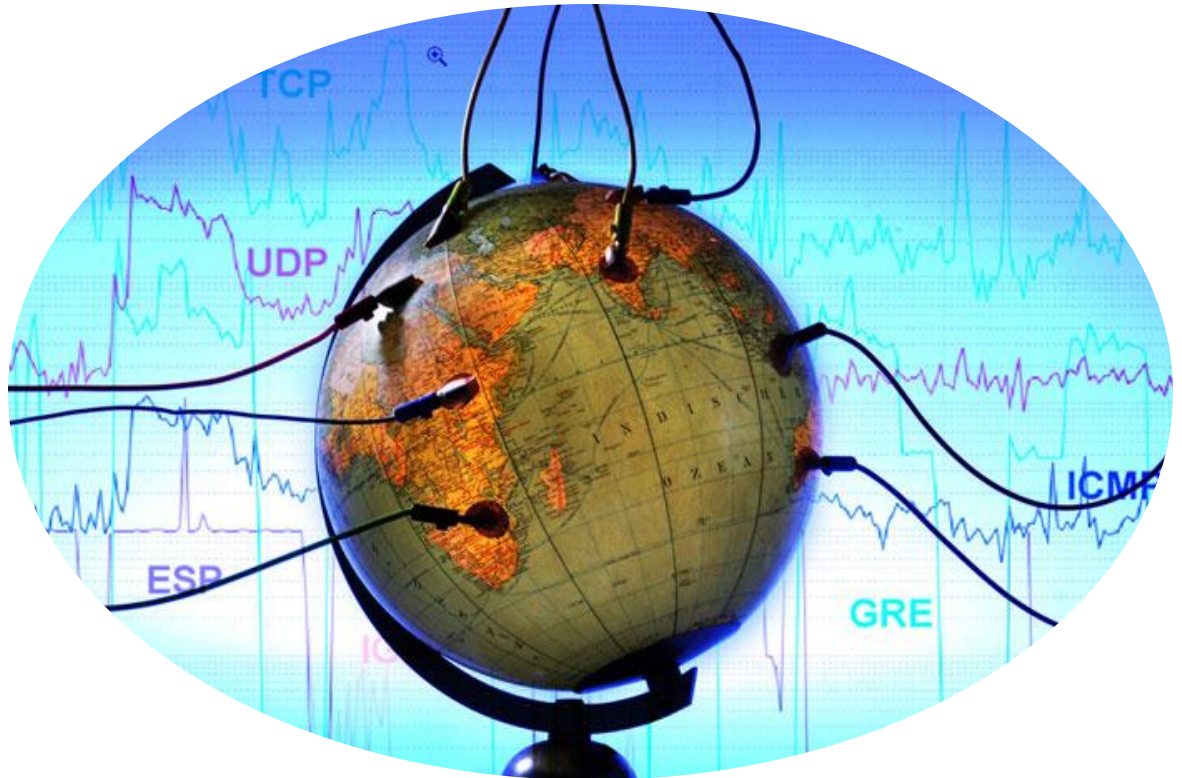
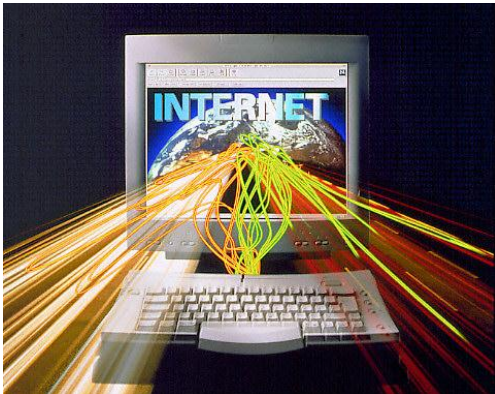


3- Ensures a **good level of service** and response to problems.



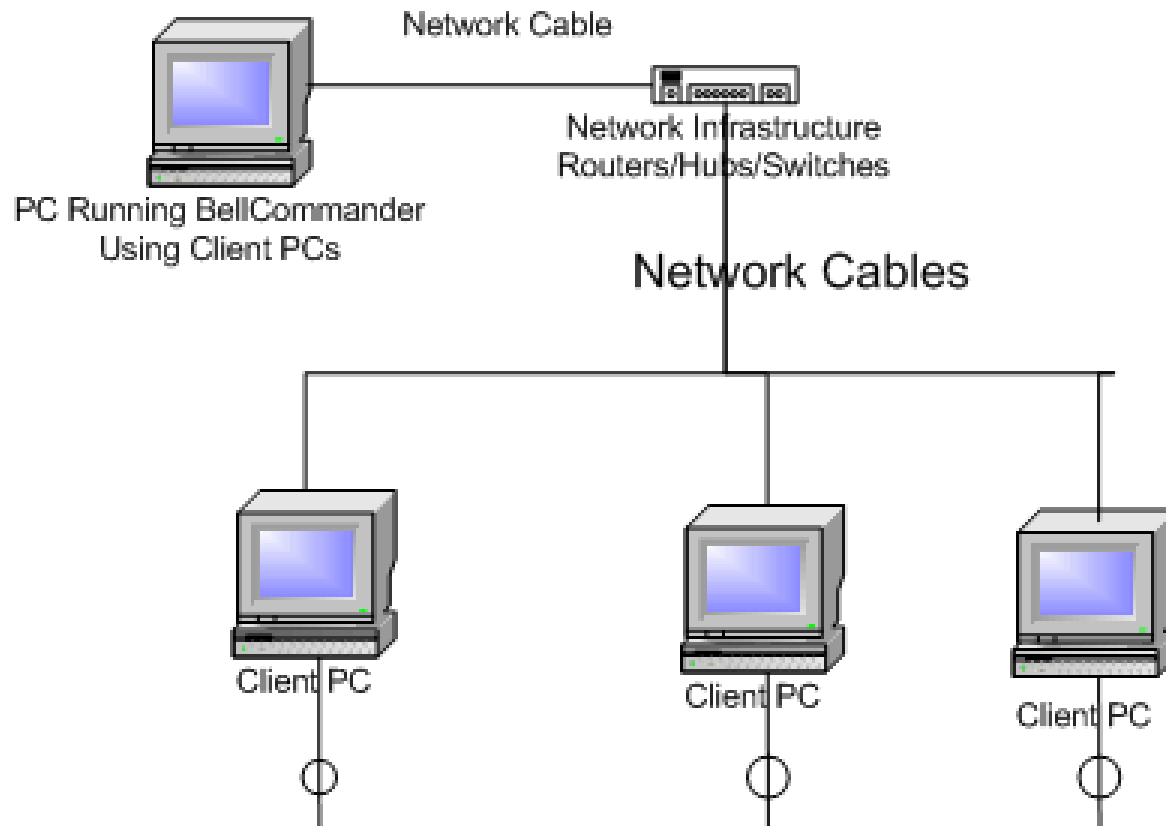
WEB BROWSER INTERFACE

Allows a user to access and view resources available through the Internet.



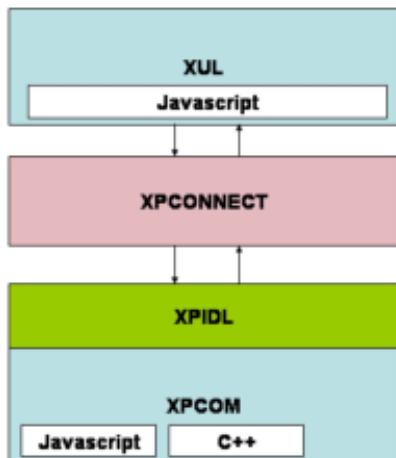
WEB BROWSER INTERFACE

Manage a facility by networking the BASs for multiple buildings.



WEB BROWSER INTERFACE

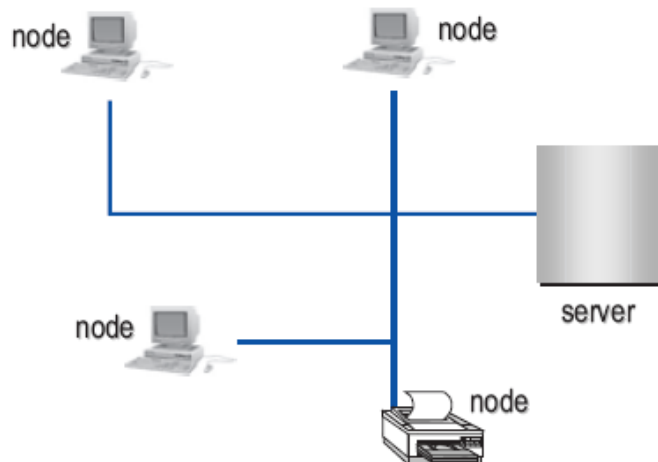
The development of a language called XML will help to boost the use of the Internet for building control.



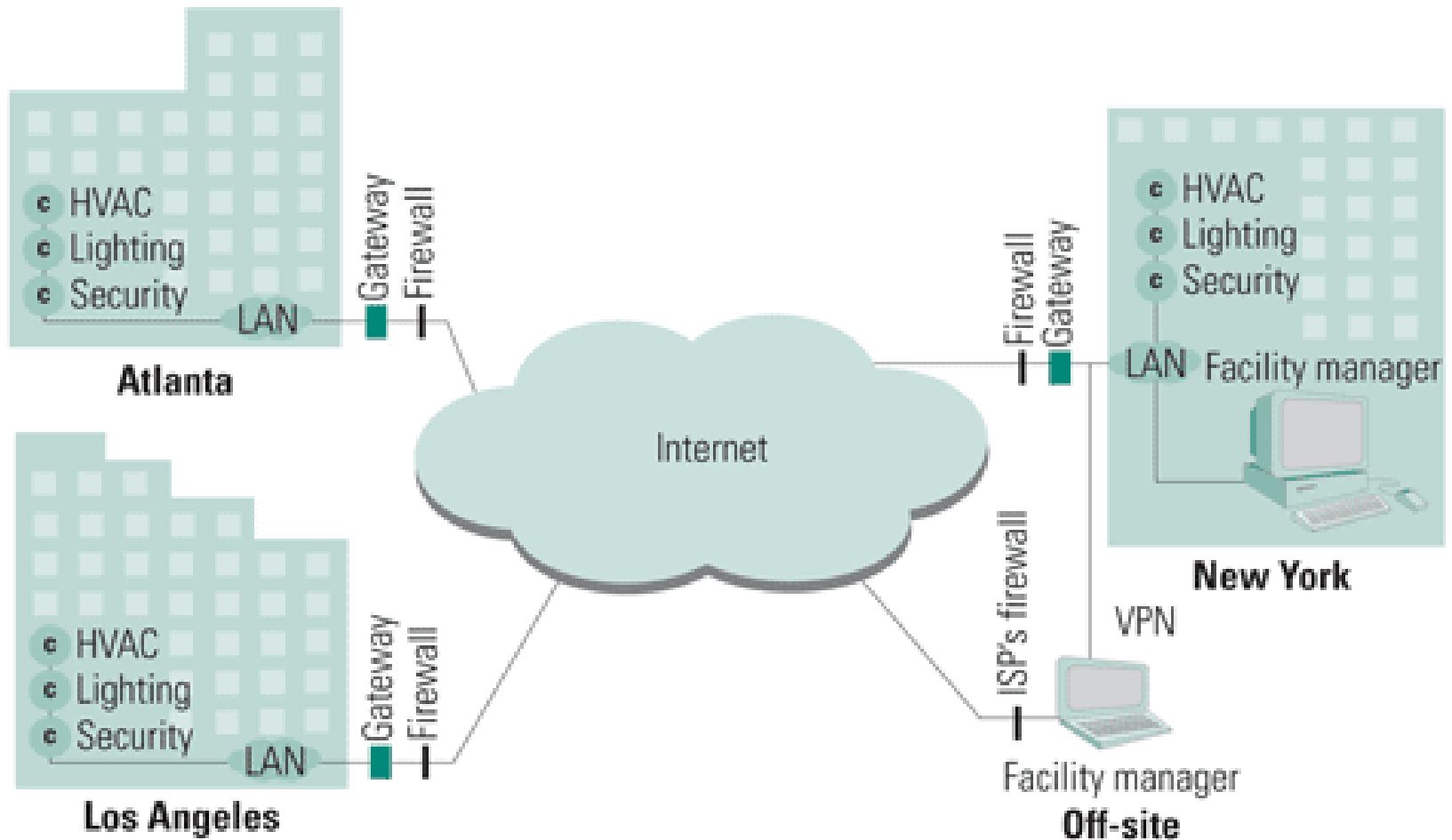
WEB BROWSER INTERFACE

**Two or more devices can exchange data
With cables or through a wireless network.**

Network



WEB BROWSER INTERFACE

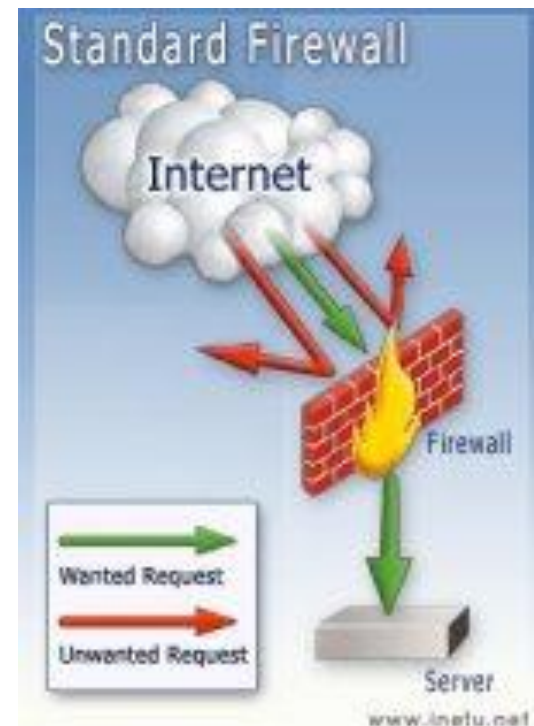


Notes: ISP = Internet service provider;
LAN = Local area network;
VPN = Virtual private network.

Source: Platts

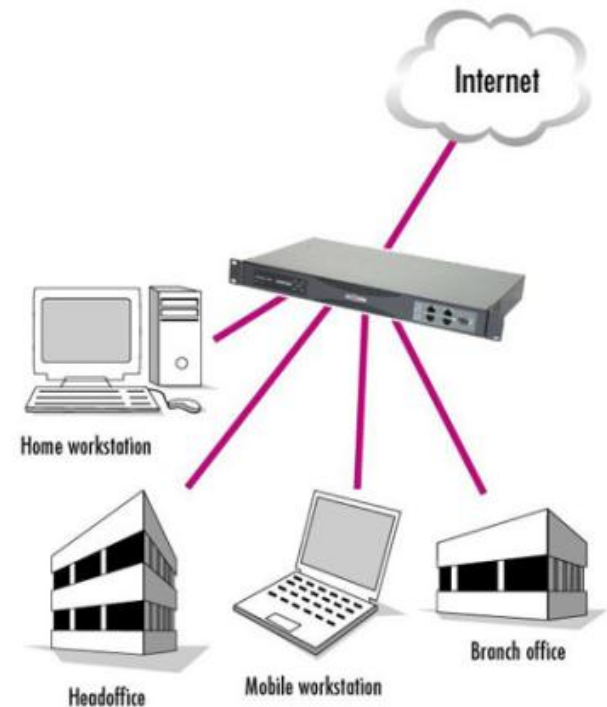
WEB BROWSER INTERFACE

Each building is connected to the Internet through a gateway that is protected by a security firewall.



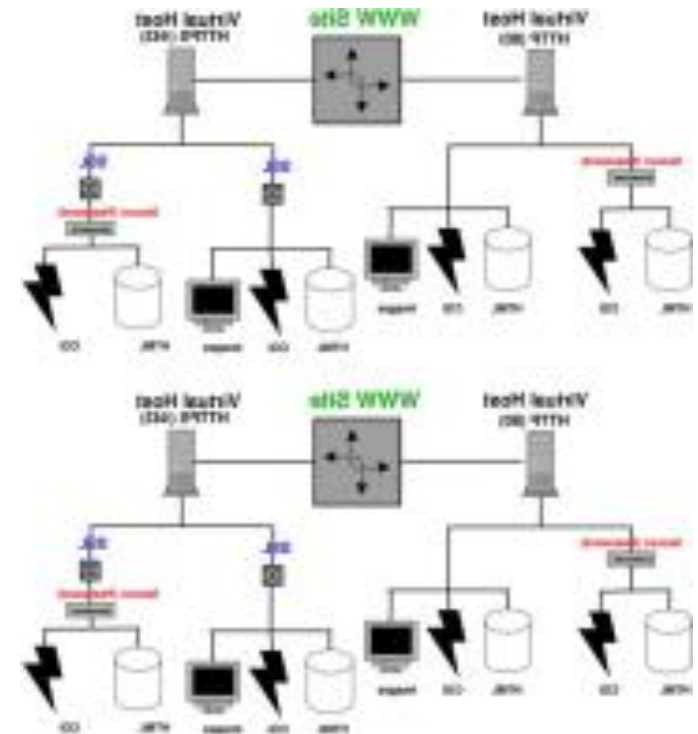
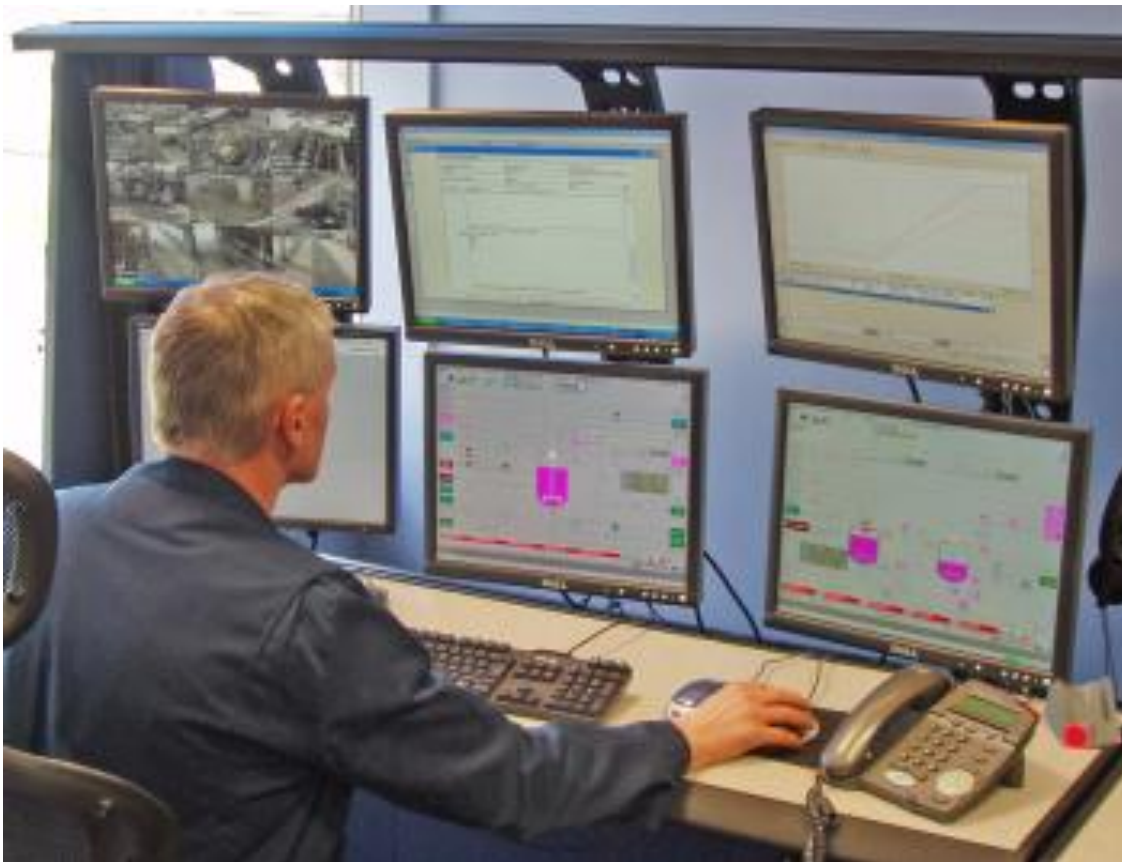
WEB BROWSER INTERFACE

Managers can monitor and control their buildings from any location with a web connection.



WEB BROWSER INTERFACE

They can also manage multiple sites simultaneously or aggregate them for load control.



Thank you

**Any
questions**

effluents	تدفق
recuperator	معوّض
cure	معالجة